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No. VI.

BALANCED MASTS.

The sum of TWENTY GUINEAS *was this session presented to Mr.* RAPHAEL CLINT *of London, for his* BALANCED *or* SWINGING MASTS, *applied to sailing-boats and other light vessels. The following communication has been received from him on the subject; and a model of the invention has been placed in the Society's repository.*

THE inventor has for some years past been connected with nautical science, as a pursuit of pleasure, mostly on the boisterous west coast of Scotland; and he is fully aware of all the vicissitudes to which vessels are exposed, and has a correct knowledge of their tactics.

This invention, now offered to the Society of Arts, &c., was originally intended for open boats; but, on trial, it appeared that, under the various modifications of which it is susceptible, it may be most advantageously adopted for decked vessels, being particularly well adapted to the use of such of them as are employed only for fast sailing, without regard to the carrying of cargoes. Of this class are revenue-cutters, mail-packets, pilot-boats, pleasure-boats, and others; and when the many important advantages resulting from the invention shall become known, none of these will refuse to make the allowance of the space required for the cradle, which will be about the same as that occupied by the engines of a steam-boat. One of the objects of this plan is to enable a vessel under a press of sail, *close hauled,* to preserve an upright position upon the water. The advantages of which position are,—1, The vessel will sail faster by dividing the water better at the bows, and by drawing less dead water at the stern. 2, The vessel will answer the helm much better. 3, The vessel will go better to windward in that position than in the awkward state of sailing upon her side. Another object is to prevent the loss of lives and property consequent upon the frequent upsetting of vessels in squalls of wind, or by inattention or fool-hardiness; for a vessel on this construction is found on trial to maintain her upright position, however violent the wind.

The model before the Society is that of a sailing vessel, six feet long, and only *nine inches broad;* of which the following is a brief description. In her hold, a semicircular cradle is suspended on the centres between two beams; in this cradle is placed a quantity of ballast, or part of cargo; in the cradle the mast is raised, and to the sides of it are fixed all the rigging, haul-yards, &c., the whole being decked in: in other respects there is no material difference above deck from ordinary vessels. A boat on this construction is enabled to carry nearly three times the common quantity of sail *close hauled,* and from its great length of shape sails with proportionably increased velocity; and however violent the pressure of the wind, the *hull* of the vessel always maintains an upright position in the water.

The preceding remarks have reference only to the application of this principle to vessels of the ordinary form; but a more important advantage, as far as relates to fast sailing, results from this construction, consisting in the diminished breadth of the vessel. The proportion of length to breadth in the model before the Society is as seven to one, and the ordinary proportion is as three to one, by which four-sevenths less of resistance is given to the progress of this vessel through the water, giving her four-sevenths of accelerated velocity in sailing.

Length, if it can be applied, is a great desideratum: it enables a vessel to go over a heavy sea with ease and speed, by making the angles of elevation and depression upon the waves less accute: it makes a vessel sail more steadily, and hold a good wind: it enables a vessel to lie at anchor and ride out a gale in greater safety, by diminishing the strain upon the cable.

To all these advantages the plan has the merit of extreme simplicity. Every stay, haul-yard, brace, sheet, tackle, and sail, is in the same place as in an ordinary vessel; and consequently, in manning a vessel on this principle for sea, the sailors would have *nothing new to learn.*

In conclusion, it may not be impertinent to remind the Society of the various means adopted by the natives of the shores of the Pacific and Indian oceans to make their long canoes carry sail.

There are the double canoe, the catamaran, the canoe with bamboo canes placed out upon cross poles, and the canoe with one side flat and a man out to windward upon a spar: these serve to exemplify the utility of length, but are fit only for an amphibious people, and are practicable only on a small scale.—See *Lord Anson's description of the Flying Proas of the Ladrone Islands.*

RAPHAEL CLINT.

In the month of May last a whale-boat was fitted up by Mr. Clint according to the above plan, and several experiments were made on her in the river Thames: on one occasion she sailed down to Erith with a full spread of canvas, and upon nearly an even keel, at a time when, from the boisterousness of the wind, the Gravesend and other sailing boats were working under reefed sails, and running nearly gunwale to. Of the novelty of Mr. Clint's plan, and its practicability to at least a certain extent, there appears no doubt; and therefore the Society have thought themselves justified in offering it to the attention of the public, without, however, pledging themselves that in its present state it is applicable safely and usefully to marine navigation.

Reference to the figures.—Plate IX.

FIG. 4 represents the relative position of the mast and hull before sail is set.

Fig 3 represents the same when the vessel is under a press of sail close hauled.

a The hull.

b The mast attached to the cradle *c*: the lower part of the cradle is partitioned off to contain the ballast.

d One of the pivots by means of which the mast and cradle are suspended, allowing them to swing laterally while the hull preserves its upright position.